interactive visualisation

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overview
• static visualisation
  - (very) brief history
• interactive visualisation
  - existing systems
  - make your own
• design heuristics

static visualisation
from clay tablets to Tufte

- Mesopotamian tablets

static visualisation
from clay tablets to Tufte

- Mesopotamian tablets
- 10th Century time line

Trends in fruit sales

static visualisation
from clay tablets to Tufte

- Mesopotamian tablets
- 10th Century time line
- Excel etc.

static visualisation
from clay tablets to Tufte

- read Tufte’s books ...
  - The Visual Display of Quantitative Information
  - Envisioning Information
  - Visual Explanations
interactive visualisation

- computation allows interaction
- interaction
  - allows exploration
  - improves comprehension
- many existing examples
- can make your own!

existing systems (i)
tourist map

- (often found at the seaside)
- revealing information

example
existing systems (ii) filesystem folder

- initially ordered by name

existing systems (ii) filesystem folder (b)

- now ordered by date

existing systems (ii) filesystem folder (c)

- reordering ‘softens’ design constraints

existing systems (iii) TableLens (a)

- like a ‘spreadsheet’ ...

existing systems (iii) TableLens (b)

- N.B. also an example of focus+context

- make your own (i) highlighting

scatter plots, line graphs ...

N.B. also an example of focus+context

focus
some rows in full detail

click with mouse to reorder

context
whole dataset can also be seen in overview

some rows in full detail

click with mouse to reorder

some rows in full detail

click with mouse to reorder

whole dataset can also be seen in overview

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whole dataset can also be seen in overview
make your own (ii)
parallel change
- tie outliner to pie chart
- example of temporal fusion

make your own (iii)
relaxing constraints
- normal stacked histogram
- good for:
  - overall trend
  - relative proportions
  - trend in bottom category
- bad for others
  - what is happening to bananas?

make your own (iii)
relaxing constraints
- interactive stacking histograms ...
  or ... dancing histograms
- normal histogram except ...

make your own (iii)
relaxing constraints
- interactive stacking histograms ...
  or ... dancing histograms
- normal histogram except ...
  - hover over cell to show detail
- click on legend to change baseline

design heuristics (i)
choosing representations
- visualisation factors
  - visual affordances
    - what we can see
  - objectives, goals and tasks
    - what we need to see
  - aesthetics
    - what we like to see
design heuristics (ii)
trade-off

- visualisation factors
  - visual affordances
  - objectives, goals and tasks
  - aesthetics
- static representation ⇒ trade-off
- interaction reduces trade-off
  - stacking histogram, overview vs. detail, etc. etc.

design heuristics (iii)
kinds of interaction

- highlighting and focus
- drill down and hyperlinks
- overview and context
- changing parameters
- changing representations
- temporal fusion